
Chapter 1. Gene regulatory networks in neural crest development and evolution.

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Public Summary:

We review the network of gene interactions that are responsible for controlling formation of neural crest cells in vertebrates. Neural crest cells are an important stem cell population, unique to vertebrates, that gives rise to much of the facial skeleton and peripheral nervous system. Work from diverse organisms like lamprey, frog, fish, chick and mouse show that this neural crest gene regulatory network is conserved to the base of vertebrates, meaning that it was invented 550 million years ago.

Scientific Abstract:

The neural crest is a multipotent migratory embryonic cell population that is present in all vertebrates, but missing from basal chordates. In this chapter, we discuss recent work in amphioxus, ascidians, lamprey, and gnathostomes that reflects the current state of knowledge of the evolutionary origin of this fascinating cell population. We summarize recent evidence for the ongoing diversification of the neural crest in several vertebrate species, with particular reference to studies in nontraditional vertebrate model organisms.

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